SEQUENCE LISTING

<110> Flint, Andrew J.
Cool, Deborah E.

<120> IMPROVED ASSAY FOR PROTEIN TYROSINE
PHOSPHATES

<130> 200125.401

<140> US/09/788,626
<141> 2001-02-13

<160> 40

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<221> VARIANT
<222> (1)...(1)
<223> Xaa = Ile or Val

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<223> Xaa = any amino acid

<220>
<221> VARIANT
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<223> Xaa = any amino acid

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<223> Xaa = any amino acid

<220>
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<222> (10)...(10)
<223> Xaa = Ser or Thr

<220>
<223> Unique signature sequence motif which is invariant
among all PTPs.

<400> 1
Xaa His Cys Xaa Ala Gly Xaa Xaa Arg Xaa Gly
1 5 10

<210> 2
<211> 254
<212> PRT

<213> Homo sapiens

<400> 2

```
Asp Phe Pro Cys Arg Val Ala Lys Leu Pro Lys Asn Lys Asn Arg Asn
 1               5                  10                  15
Arg Tyr Arg Asp Val Ser Pro Phe Asp His Ser Arg Ile Lys Leu His
            20                  25                  30
Gln Glu Asp Asn Asp Tyr Ile Asn Ala Ser Leu Ile Lys Met Glu Glu
        35                  40                  45
Ala Gln Arg Ser Tyr Ile Leu Thr Gln Gly Pro Leu Pro Asn Thr Cys
    50                  55                  60
Gly His Phe Trp Glu Met Val Trp Glu Gln Lys Ser Arg Gly Val Val
65                  70                  75                  80
Met Leu Asn Arg Val Met Glu Lys Gly Ser Leu Lys Cys Ala Gln Tyr
                85                  90                  95
Trp Pro Gln Lys Glu Glu Lys Glu Met Ile Phe Glu Asp Thr Asn Leu
            100                 105                 110
Lys Leu Thr Leu Ile Ser Glu Asp Ile Lys Ser Tyr Tyr Thr Val Leu
        115                 120                 125
Glu Leu Glu Asn Leu Thr Thr Gln Glu Thr Arg Glu Ile Leu His Phe
    130                 135                 140
His Tyr Thr Thr Trp Pro Asp Phe Gly Val Pro Glu Ser Pro Ala Ser
145                 150                 155                 160
Phe Leu Asn Phe Leu Phe Lys Val Arg Glu Ser Gly Ser Leu Ser Pro
                165                 170                 175
Glu His Gly Pro Val Val Val His Cys Ser Ala Gly Ile Gly Arg Ser
            180                 185                 190
Gly Thr Phe Cys Leu Ala Asp Thr Cys Leu Leu Leu Met Asp Lys Arg
        195                 200                 205
Lys Asp Pro Ser Ser Val Asp Ile Lys Lys Val Leu Leu Glu Met Arg
    210                 215                 220
Lys Phe Arg Met Gly Leu Ile Gln Thr Ala Asp Gln Leu Arg Phe Ser
225                 230                 235                 240
Tyr Leu Ala Val Ile Glu Gly Ala Lys Phe Ile Met Gly Asp
                245                 250
```

<210> 3
<211> 251
<212> PRT
<213> Homo sapiens

<400> 3

```
Asp Tyr Pro His Arg Val Ala Lys Phe Pro Glu Asn Arg Asn Arg Asn
 1               5                  10                  15
Arg Tyr Arg Asp Val Ser Pro Tyr Asp His Ser Arg Val Leu Gln Asn
            20                  25                  30
Ala Glu Asn Asp Tyr Ile Asn Ala Ser Leu Val Asp Ile Glu Glu Ala
        35                  40                  45
Gln Arg Ser Tyr Ile Leu Thr Gln Gly Pro Leu Pro Asn Thr Cys Cys
    50                  55                  60
His Phe Trp Leu Met Val Trp Gln Gln Lys Thr Lys Ala Val Val Met
65                  70                  75                  80
Leu Asn Arg Ile Val Glu Lys Glu Ser Val Lys Cys Ala Gln Tyr Trp
                85                  90                  95
```

```
Pro Thr Arg Asp Gln Glu Met Leu Phe Lys Glu Thr Gly Phe Ser Val
                100                 105                 110
Lys Leu Leu Ser Glu Asp Val Lys Ser Tyr Tyr Thr Val Leu Gln Leu
            115                 120                 125
Glu Asn Ile Asn Ser Gly Glu Thr Arg Thr Ile Ser His Phe His Tyr
        130                 135                 140
Thr Thr Trp Pro Asp Phe Gly Val Pro Glu Ser Pro Ala Ser Phe Leu
145                 150                 155                 160
Asn Phe Leu Phe Lys Val Arg Glu Ser Gly Ser Leu Asn Pro Asp His
                165                 170                 175
Gly Pro Ala Val Ile His Cys Ser Ala Gly Ile Gly Arg Ser Gly Thr
            180                 185                 190
Phe Ser Leu Val Asp Thr Cys Leu Val Leu Met Glu Lys Gly Asp Asp
        195                 200                 205
Ile Asn Ile Lys Gln Val Leu Leu Asn Met Arg Lys Tyr Arg Met Gly
    210                 215                 220
Leu Ile Gln Thr Pro Asp Gln Leu Arg Phe Ser Tyr Met Ala Ile Ile
225                 230                 235                 240
Glu Gly Ala Lys Cys Ile Lys Gly Asp Ser Ser
                245                 250
```

<210> 4
<211> 317
<212> PRT
<213> Homo sapiens

```
<400> 4
Gly Ile Thr Ala Asp Ser Ser Asn His Pro Asp Asn Lys His Lys Asn
 1               5                  10                  15
Arg Tyr Ile Asn Ile Val Ala Tyr Asp His Ser Arg Val Lys Leu Ala
            20                  25                  30
Gln Leu Ala Glu Lys Asp Gly Lys Leu Thr Asp Tyr Ile Asn Ala Asn
        35                  40                  45
Tyr Val Asp Gly Tyr Asn Arg Pro Lys Ala Tyr Ile Ala Ala Gln Gly
    50                  55                  60
Pro Leu Lys Ser Thr Ala Glu Asp Phe Trp Arg Met Ile Trp Glu His
65                  70                  75                  80
Asn Val Glu Val Ile Val Met Ile Thr Asn Leu Val Glu Lys Gly Arg
                85                  90                  95
Arg Lys Cys Asp Gln Tyr Trp Pro Pro Ala Asp Gly Ser Glu Glu Tyr
            100                 105                 110
Gly Asn Phe Leu Val Thr Gln Lys Ser Val Gln Val Leu Ala Tyr Tyr
        115                 120                 125
Thr Val Phe Thr Leu Arg Asn Thr Lys Ile Lys Lys Gly Ser Gln Lys
    130                 135                 140
Gly Arg Pro Ser Gly Arg Val Val Thr Gln Tyr His Tyr Thr Gln Trp
145                 150                 155                 160
Pro Asp Met Gly Val Pro Glu Tyr Ser Leu Pro Val Leu Thr Phe Val
                165                 170                 175
Arg Lys Ala Ala Tyr Ala Lys Arg His Ala Val Gly Pro Val Val Val
            180                 185                 190
His Cys Ser Ala Gly Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp
        195                 200                 205
Ser Met Leu Gln Gln Ile Gln His Glu Gly Thr Val Asn Ile Phe Gly
```

210 215 220
Phe Leu Lys His Ile Arg Ser Gln Arg Asn Tyr Leu Val Gln Thr Glu
225 230 235 240
Glu Gln Tyr Val Phe Ile His Asp Thr Leu Val Glu Ala Ile Leu Ser
245 250 255
Lys Glu Thr Glu Val Val Leu Asp Ser Met Leu Gln Gln Ile Gln His
260 265 270
Glu Gly Thr Val Asn Ile Phe Gly Phe Leu Lys His Ile Arg Ser Gln
275 280 285
Arg Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Val Phe Ile His Asp
290 295 300
Thr Leu Val Glu Ala Ile Leu Ser Lys Glu Thr Glu Val
305 310 315

<210> 5
<211> 316
<212> PRT
<213> Homo sapiens

<400> 5
Gly Ile Thr Ala Asp Ser Ser Asn His Pro Asp Asn Lys His Lys Asn
1 5 10 15
Arg Tyr Ile Asn Ile Val Ala Tyr Asp His Ser Arg Val Lys Leu Ala
20 25 30
Gln Leu Ala Glu Lys Asp Gly Lys Leu Thr Asp Tyr Ile Asn Ala Asn
35 40 45
Tyr Val Asp Gly Tyr Asn Arg Pro Lys Ala Tyr Ile Ala Ala Gln Gly
50 55 60
Pro Leu Lys Ser Thr Ala Glu Asp Phe Trp Arg Met Ile Trp Glu His
65 70 75 80
Asn Val Glu Val Ile Val Met Ile Thr Asn Leu Val Glu Lys Gly Arg
85 90 95
Arg Lys Cys Asp Gln Tyr Trp Pro Ala Asp Gly Ser Glu Glu Tyr Gly
100 105 110
Asn Phe Leu Val Thr Gln Lys Ser Val Gln Val Leu Ala Tyr Tyr Thr
115 120 125
Val Phe Thr Leu Arg Asn Thr Lys Ile Lys Lys Gly Ser Gln Lys Gly
130 135 140
Arg Pro Ser Gly Arg Val Val Thr Gln Tyr His Tyr Thr Gln Trp Pro
145 150 155 160
Asp Met Gly Val Pro Glu Tyr Ser Leu Pro Val Leu Thr Phe Val Arg
165 170 175
Lys Ala Ala Tyr Ala Lys Arg His Ala Val Gly Pro Val Val Val His
180 185 190
Cys Ser Ala Gly Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp Ser
195 200 205
Met Leu Gln Gln Ile Gln His Glu Gly Thr Val Asn Ile Phe Gly Phe
210 215 220
Leu Lys His Ile Arg Ser Gln Arg Asn Tyr Leu Val Gln Thr Glu Glu
225 230 235 240
Gln Tyr Val Phe Ile His Asp Thr Leu Val Glu Ala Ile Leu Ser Lys
245 250 255
Glu Thr Glu Val Val Leu Asp Ser Met Leu Gln Gln Ile Gln His Glu
260 265 270

Gly Thr Val Asn Ile Phe Gly Phe Leu Lys His Ile Arg Ser Gln Arg
275 280 285
Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Val Phe Ile His Asp Thr
290 295 300
Leu Val Glu Ala Ile Leu Ser Lys Glu Thr Glu Val
305 310 315

<210> 6
<211> 319
<212> PRT
<213> Homo sapiens

<400> 6
Asn Ile Thr Ala Glu His Ser Asn His Pro Glu Asn Lys His Lys Asn
1 5 10 15
Arg Tyr Ile Asn Ile Leu Ala Tyr Asp His Ser Arg Val Lys Leu Arg
20 25 30
Pro Leu Pro Gly Lys Asp Ser Lys His Ser Asp Tyr Ile Asn Ala Asn
35 40 45
Tyr Val Asp Gly Tyr Asn Lys Ala Lys Ala Tyr Ile Ala Thr Gln Gly
50 55 60
Pro Leu Lys Ser Thr Phe Glu Asp Phe Trp Arg Met Ile Trp Glu Gln
65 70 75 80
Asn Thr Gly Ile Ile Val Met Ile Thr Asn Leu Val Glu Lys Gly Arg
85 90 95
Arg Lys Cys Asp Gln Tyr Trp Pro Thr Glu Asn Ser Glu Glu Tyr Gly
100 105 110
Asn Ile Ile Val Thr Leu Lys Ser Thr Lys Ile His Ala Cys Tyr Thr
115 120 125
Val Phe Ser Ile Arg Asn Thr Lys Val Lys Lys Gly Gln Lys Gly Asn
130 135 140
Pro Lys Gly Arg Gln Asn Glu Arg Val Val Ile Gln Tyr His Tyr Thr
145 150 155 160
Gln Trp Pro Asp Met Gly Val Pro Glu Tyr Ala Leu Pro Val Leu Thr
165 170 175
Phe Val Arg Arg Ser Ser Ala Ala Arg Met Pro Glu Thr Gly Pro Val
180 185 190
Leu Val His Cys Ser Ala Gly Val Gly Arg Thr Gly Thr Tyr Ile Val
195 200 205
Ile Asp Ser Met Leu Gln Gln Ile Lys Asp Lys Ser Thr Val Asn Val
210 215 220
Leu Gly Phe Leu Lys His Ile Arg Thr Gln Arg Asn Tyr Leu Val Gln
225 230 235 240
Thr Glu Glu Gln Tyr Ile Phe Ile His Asp Ala Leu Leu Glu Ala Ile
245 250 255
Leu Gly Lys Glu Thr Glu Val Val Ile Asp Ser Met Leu Gln Gln Ile
260 265 270
Lys Asp Lys Ser Thr Val Asn Val Leu Gly Phe Leu Lys His Ile Arg
275 280 285
Thr Gln Arg Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Ile Phe Ile
290 295 300
His Asp Ala Leu Leu Glu Ala Ile Leu Gly Lys Glu Thr Glu Val
305 310 315

<210> 7
<211> 313
<212> PRT
<213> Drosophila melanogaster

<400> 7
Asp Leu Pro Cys Glu His Ser Gln His Pro Glu Asn Lys Arg Lys Asn
1 5 10 15
Arg Tyr Leu Asn Ile Thr Ala Tyr Asp His Ser Arg Val His Leu His
20 25 30
Pro Thr Pro Gly Gln Lys Lys Asn Leu Asp Tyr Ile Asn Ala Asn Phe
35 40 45
Ile Asp Gly Tyr Gln Lys Gly His Ala Phe Ile Gly Thr Gln Gly Pro
50 55 60
Leu Pro Asp Thr Phe Asp Cys Phe Trp Arg Met Ile Trp Glu Gln Arg
65 70 75 80
Val Ala Ile Ile Val Met Ile Thr Asn Leu Val Glu Arg Gly Arg Arg
85 90 95
Lys Cys Asp Met Tyr Trp Pro Lys Asp Gly Val His Thr Tyr Gly Val
100 105 110
Ile Gln Val Lys Leu Ile Glu Glu Glu Val Met Ser Thr Tyr Thr Val
115 120 125
Leu Gln Ile Lys His Leu Lys Leu Lys Lys Lys Lys Gln Cys Asn Thr
130 135 140
Glu Lys Leu Val Tyr Gln Tyr His Tyr Thr Asn Trp Pro Asp His Gly
145 150 155 160
Thr Pro Asp His Pro Leu Pro Val Leu Asn Phe Val Lys Lys Ser Ser
165 170 175
Ala Ala Asn Pro Ala Glu Ala Gly Pro Ile Val Val His Cys Ser Ala
180 185 190
Gly Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp Ala Met Leu Lys
195 200 205
Gln Ile Gln Gln Lys Asn Ile Val Asn Val Phe Gly Phe Leu Arg His
210 215 220
Ile Arg Ala Gln Arg Asn Phe Leu Val Gln Thr Glu Glu Gln Tyr Ile
225 230 235 240
Phe Leu His Asp Ala Leu Val Glu Ala Ile Ala Ser Gly Glu Thr Asn
245 250 255
Leu Val Leu Asp Ala Met Leu Lys Gln Ile Gln Gln Lys Asn Ile Val
260 265 270
Asn Val Phe Gly Phe Leu Arg His Ile Arg Ala Gln Arg Asn Phe Leu
275 280 285
Val Gln Thr Glu Glu Gln Tyr Ile Phe Leu His Asp Ala Leu Val Glu
290 295 300
Ala Ile Ala Ser Gly Glu Thr Asn Leu
305 310

<210> 8
<211> 306
<212> PRT
<213> Homo sapiens

<400> 8
Gln Phe Thr Trp Glu Asn Ser Asn Leu Glu Val Asn Asp Ile Lys Asn

```
 1               5                  10                  15
Arg Tyr Ala Asn Val Ile Ala Tyr Asp His Ser Arg Val Ile Leu Thr
            20                  25                  30
Ser Ile Asp Gly Val Pro Gly Ser Asp Tyr Ile Asn Ala Asn Tyr Ile
        35                  40                  45
Asp Gly Tyr Arg Lys Gln Asn Ala Tyr Ile Ala Thr Gln Gly Pro Leu
    50                  55                  60
Pro Glu Thr Met Gly Asp Phe Trp Arg Met Val Trp Glu Gln Arg Thr
65                  70                  75                  80
Ala Thr Val Val Met Met Thr Arg Leu Glu Glu Lys Ser Arg Val Lys
                85                  90                  95
Cys Asp Gln Tyr Trp Pro Ala Arg Gly Thr Glu Thr Cys Gly Leu Ile
            100                 105                 110
Gln Val Thr Leu Leu Asp Thr Val Glu Leu Ala Thr Tyr Thr Val Phe
        115                 120                 125
Ala Leu His Lys Ser Gly Ser Ser Glu Lys Arg Glu Leu Arg Gln Phe
    130                 135                 140
Gln Phe Met Ala Trp Pro Asp His Gly Val Pro Glu Tyr Pro Thr Pro
145                 150                 155                 160
Ile Leu Ala Phe Leu Arg Arg Val Lys Ala Cys Asn Pro Leu Asp Ala
                165                 170                 175
Gly Pro Met Val Val His Cys Ser Ala Gly Val Gly Arg Thr Gly Cys
            180                 185                 190
Phe Ile Val Ile Asp Ala Met Leu Glu Arg Met Lys His Glu Lys Thr
        195                 200                 205
Val Asp Ile Tyr Gly His Val Thr Cys Met Arg Ser Gln Arg Asn Tyr
    210                 215                 220
Met Val Gln Thr Glu Asp Gln Tyr Val Phe Ile His Glu Ala Leu Leu
225                 230                 235                 240
Glu Ala Ala Thr Cys Gly His Thr Glu Val Val Ile Asp Ala Met Leu
                245                 250                 255
Glu Arg Met Lys His Glu Lys Thr Val Asp Ile Tyr Gly His Val Thr
            260                 265                 270
Cys Met Arg Ser Gln Arg Asn Tyr Met Val Gln Thr Glu Asp Gln Tyr
        275                 280                 285
Val Phe Ile His Glu Ala Leu Leu Glu Ala Ala Thr Cys Gly His Thr
    290                 295                 300
Glu Val
305
```

<210> 9
<211> 305
<212> PRT
<213> Homo sapiens

<400> 9

```
Ser Ala Pro Trp Asp Ser Ala Lys Lys Asp Glu Asn Arg Met Lys Asn
 1               5                  10                  15
Arg Tyr Gly Asn Ile Ile Ala Tyr Asp His Ser Arg Val Arg Leu Gln
            20                  25                  30
Thr Ile Glu Gly Asp Thr Asn Ser Asp Tyr Ile Asn Gly Asn Tyr Ile
        35                  40                  45
Asp Gly Tyr His Arg Pro Asn His Tyr Ile Ala Thr Gln Gly Pro Met
    50                  55                  60
```

Gln Glu Thr Ile Tyr Asp Phe Trp Arg Met Val Trp His Glu Asn Thr
65 70 75 80
Ala Ser Ile Ile Met Val Thr Asn Leu Val Glu Val Gly Arg Val Lys
85 90 95
Cys Cys Lys Tyr Trp Pro Asp Asp Thr Glu Ile Tyr Lys Asp Ile Lys
100 105 110
Val Thr Leu Ile Glu Thr Glu Leu Leu Ala Glu Tyr Val Ile Phe Ala
115 120 125
Val Glu Lys Arg Gly Val His Glu Ile Arg Glu Ile Arg Gln Phe His
130 135 140
Phe Thr Gly Trp Pro Asp His Gly Val Pro Tyr His Ala Thr Gly Leu
145 150 155 160
Leu Gly Phe Val Arg Gln Val Lys Ser Lys Ser Pro Pro Ser Ala Gly
165 170 175
Pro Leu Val Val His Cys Ser Ala Gly Ala Gly Arg Thr Gly Cys Phe
180 185 190
Ile Val Ile Asp Ile Met Leu Asp Met Ala Glu Arg Glu Gly Val Val
195 200 205
Asp Ile Tyr Asn Cys Val Arg Glu Leu Arg Ser Arg Arg Val Asn Met
210 215 220
Val Gln Thr Glu Glu Gln Tyr Val Phe Ile His Asp Ala Ile Leu Glu
225 230 235 240
Ala Cys Leu Cys Gly Asp Thr Ser Val Val Ile Asp Ile Met Leu Asp
245 250 255
Met Ala Glu Arg Glu Gly Val Val Asp Ile Tyr Asn Cys Val Arg Glu
260 265 270
Leu Arg Ser Arg Arg Val Asn Met Val Gln Thr Glu Glu Gln Tyr Val
275 280 285
Phe Ile His Asp Ala Ile Leu Glu Ala Cys Leu Cys Gly Asp Thr Ser
290 295 300
Val
305

<210> 10
<211> 310
<212> PRT
<213> Homo sapiens

<400> 10
Gln Ala Thr Cys Glu Ala Ala Ser Lys Glu Glu Asn Lys Glu Lys Asn
1 5 10 15
Arg Tyr Val Asn Ile Leu Pro Tyr Asp His Ser Arg Val His Leu Thr
20 25 30
Pro Val Glu Gly Val Pro Asp Ser Asp Tyr Ile Asn Ala Ser Phe Ile
35 40 45
Asn Gly Tyr Gln Glu Lys Asn Lys Phe Ile Ala Ala Gln Gly Pro Lys
50 55 60
Glu Glu Thr Val Asn Asp Phe Trp Arg Met Ile Trp Glu Gln Asn Thr
65 70 75 80
Ala Thr Ile Val Met Val Thr Asn Leu Lys Glu Arg Lys Glu Cys Lys
85 90 95
Cys Ala Gln Tyr Trp Pro Asp Gln Gly Cys Trp Thr Tyr Gly Asn Ile
100 105 110
Arg Val Ser Val Glu Asp Val Thr Val Leu Val Asp Tyr Thr Val Arg

```
          115                 120                 125
Cys Ile Gln Gln Val Gly Asp Met Thr Asn Arg Lys Pro Gln Arg Leu
    130                 135                 140
Ile Thr Gln Phe His Phe Thr Ser Trp Pro Asp Phe Gly Val Pro Phe
145                 150                 155                 160
Thr Pro Ile Gly Met Leu Lys Phe Leu Lys Lys Val Lys Ala Cys Asn
                165                 170                 175
Pro Gln Tyr Ala Gly Ala Ile Val Val His Cys Ser Ala Gly Val Gly
            180                 185                 190
Arg Thr Gly Thr Phe Val Val Ile Asp Ala Met Leu Asp Met Met His
        195                 200                 205
Thr Glu Arg Lys Val Asp Val Tyr Gly Phe Val Ser Arg Ile Arg Ala
    210                 215                 220
Gln Arg Cys Gln Met Val Gln Thr Asp Met Gln Tyr Val Phe Ile Tyr
225                 230                 235                 240
Gln Ala Leu Leu Glu His Tyr Leu Tyr Gly Asp Thr Glu Leu Val Ile
                245                 250                 255
Asp Ala Met Leu Asp Met Met His Thr Glu Arg Lys Val Asp Val Tyr
            260                 265                 270
Gly Phe Val Ser Arg Ile Arg Ala Gln Arg Cys Gln Met Val Gln Thr
        275                 280                 285
Asp Met Gln Tyr Val Phe Ile Tyr Gln Ala Leu Leu Glu His Tyr Leu
    290                 295                 300
Tyr Gly Asp Thr Glu Leu
305                 310
```

<210> 11
<211> 309
<212> PRT
<213> Homo sapiens

<400> 11

```
Gln Gly Thr Phe Glu Leu Ala Asn Lys Glu Glu Asn Arg Glu Lys Asn
 1               5                  10                  15
Arg Tyr Pro Asn Ile Leu Pro Asn Asp His Ser Arg Val Ile Leu Ser
            20                  25                  30
Gln Leu Asp Gly Ile Pro Cys Ser Asp Tyr Ile Asn Ala Ser Tyr Ile
        35                  40                  45
Asp Gly Tyr Lys Glu Lys Asn Lys Phe Ile Ala Ala Gln Gly Pro Lys
    50                  55                  60
Gln Glu Thr Val Asn Asp Phe Trp Arg Met Val Trp Glu Gln Lys Ser
65                  70                  75                  80
Ala Thr Ile Val Met Leu Thr Asn Leu Lys Glu Arg Lys Glu Glu Lys
                85                  90                  95
Cys His Gln Tyr Trp Pro Asp Gln Gly Cys Trp Thr Tyr Gly Asn Ile
            100                 105                 110
Arg Val Cys Val Glu Asp Cys Val Val Leu Val Asp Tyr Thr Ile Phe
        115                 120                 125
Cys Ile Gln Pro Gln Leu Pro Asp Gly Cys Lys Ala Pro Arg Leu Val
    130                 135                 140
Ser Gln Leu His Phe Thr Ser Trp Pro Asp Phe Gly Val Pro Phe Thr
145                 150                 155                 160
Pro Ile Gly Met Leu Lys Phe Leu Lys Lys Val Lys Thr Leu Asn Pro
                165                 170                 175
```

```
Val His Ala Gly Pro Ile Val Val His Cys Ser Ala Gly Val Gly Arg
            180                 185                 190
Thr Gly Thr Phe Ile Val Ile Asp Ala Met Met Ala Met Met His Ala
        195                 200                 205
Glu Gln Lys Val Asp Val Phe Glu Phe Val Ser Arg Ile Arg Asn Gln
    210                 215                 220
Arg Pro Gln Met Val Gln Thr Asp Met Gln Tyr Thr Phe Ile Tyr Gln
225                 230                 235                 240
Ala Leu Leu Glu Tyr Tyr Leu Tyr Gly Asp Thr Glu Leu Val Ile Asp
                245                 250                 255
Ala Met Met Ala Met Met His Ala Glu Gln Lys Val Asp Val Phe Glu
            260                 265                 270
Phe Val Ser Arg Ile Arg Asn Gln Arg Pro Gln Met Val Gln Thr Asp
        275                 280                 285
Met Gln Tyr Thr Phe Ile Tyr Gln Ala Leu Leu Glu Tyr Tyr Leu Tyr
    290                 295                 300
Gly Asp Thr Glu Leu
305
```

<210> 12
<211> 309
<212> PRT
<213> Mus musculus

<400> 12

```
Lys Phe Pro Ile Lys Asp Ala Arg Lys Pro His Asn Gln Asn Lys Asn
 1               5                  10                  15
Arg Tyr Val Asp Ile Leu Pro Tyr Asp Tyr Asn Arg Val Glu Leu Ser
            20                  25                  30
Glu Ile Asn Gly Asp Ala Gly Ser Thr Tyr Ile Asn Ala Ser Tyr Ile
        35                  40                  45
Asp Gly Phe Lys Glu Pro Arg Lys Tyr Ile Ala Ala Gln Gly Pro Arg
    50                  55                  60
Asp Glu Thr Val Asp Asp Phe Trp Arg Met Ile Trp Glu Gln Lys Ala
65                  70                  75                  80
Thr Val Ile Val Met Val Thr Arg Cys Glu Glu Gly Asn Arg Asn Lys
                85                  90                  95
Cys Ala Glu Tyr Trp Pro Ser Met Glu Glu Gly Thr Arg Ala Phe Lys
            100                 105                 110
Asp Ile Val Val Thr Ile Asn Asp His Lys Arg Cys Pro Asp Tyr Ile
        115                 120                 125
Ile Leu Asn Val Ala His Lys Lys Glu Lys Ala Thr Gly Arg Glu Val
    130                 135                 140
Thr His Ile Gln Phe Thr Ser Trp Pro Asp His Gly Val Pro Glu Asp
145                 150                 155                 160
Pro His Leu Leu Leu Lys Leu Arg Arg Arg Val Asn Ala Phe Ser Asn
                165                 170                 175
Phe Phe Ser Gly Pro Ile Val Val His Cys Ser Ala Gly Val Gly Arg
            180                 185                 190
Thr Gly Thr Tyr Ile Gly Ile Asp Ala Met Leu Glu Gly Leu Glu Ala
        195                 200                 205
Glu Gly Lys Val Asp Val Tyr Gly Tyr Val Val Lys Leu Arg Arg Gln
    210                 215                 220
Arg Cys Leu Met Val Gln Val Glu Ala Gln Tyr Ile Leu Ile His Gln
```

```
225                 230                 235                 240
Ala Leu Val Glu Tyr Asn Gln Phe Gly Glu Thr Glu Val Gly Ile Asp
                245                 250                 255
Ala Met Leu Glu Gly Leu Glu Ala Glu Gly Lys Val Asp Val Tyr Gly
            260                 265                 270
Tyr Val Val Lys Leu Arg Arg Gln Arg Cys Leu Met Val Gln Val Glu
        275                 280                 285
Ala Gln Tyr Ile Leu Ile His Gln Ala Leu Val Glu Tyr Asn Gln Phe
    290                 295                 300
Gly Glu Thr Glu Val
305
```

<210> 13
<211> 325
<212> PRT
<213> Homo sapiens

<400> 13

```
Leu Tyr Ser Arg Lys Glu Gly Gln Arg Gln Glu Asn Lys Asn Lys Asn
 1               5                  10                  15
Arg Tyr Lys Asn Ile Leu Pro Phe Asp His Thr Arg Val Val Leu His
            20                  25                  30
Asp Gly Asp Pro Asn Glu Pro Val Ser Asp Tyr Ile Asn Ala Asn Ile
        35                  40                  45
Ile Met Pro Glu Phe Glu Thr Lys Cys Asn Asn Ser Lys Pro Lys Lys
    50                  55                  60
Ser Tyr Ile Ala Thr Gln Gly Cys Leu Gln Asn Thr Val Asn Asp Phe
65                  70                  75                  80
Trp Arg Met Val Phe Gln Glu Asn Ser Arg Val Ile Val Met Thr Thr
                85                  90                  95
Lys Glu Val Glu Arg Gly Lys Ser Lys Cys Val Lys Tyr Trp Pro Asp
            100                 105                 110
Glu Tyr Ala Leu Lys Glu Tyr Gly Val Met Arg Val Arg Asn Val Lys
        115                 120                 125
Glu Ser Ala Ala His Asp Tyr Thr Leu Leu Lys Leu Ser Lys Val Gly
    130                 135                 140
Gln Gly Asn Thr Glu Arg Thr Val Trp Gln Tyr His Phe Arg Thr Trp
145                 150                 155                 160
Pro Asp His Gly Val Pro Ser Asp Pro Gly Gly Val Leu Asp Phe Leu
                165                 170                 175
Glu Glu Val His His Lys Gln Glu Ser Ile Met Asp Ala Gly Pro Val
            180                 185                 190
Val Val His Cys Ser Ala Gly Ile Gly Arg Thr Gly Thr Phe Ile Val
        195                 200                 205
Ile Asp Ile Leu Ile Asp Ile Ile Arg Glu Lys Gly Val Asp Cys Asp
    210                 215                 220
Ile Asp Val Pro Lys Thr Ile Gln Met Val Arg Ser Gln Arg Ser Gly
225                 230                 235                 240
Met Val Gln Thr Glu Ala Gln Tyr Arg Phe Ile Tyr Met Ala Val Gln
                245                 250                 255
His Tyr Ile Glu Thr Leu Gln Arg Arg Ile Val Ile Asp Ile Leu Ile
            260                 265                 270
Asp Ile Ile Arg Glu Lys Gly Val Asp Cys Asp Ile Asp Val Pro Lys
        275                 280                 285
```

Thr Ile Gln Met Val Arg Ser Gln Arg Ser Gly Met Val Gln Thr Glu
290 295 300
Ala Gln Tyr Arg Phe Ile Tyr Met Ala Val Gln His Tyr Ile Glu Thr
305 310 315 320
Leu Gln Arg Arg Ile
325

<210> 14
<211> 322
<212> PRT
<213> Homo sapiens

<400> 14
Leu His Gln Arg Leu Glu Gly Gln Arg Pro Glu Asn Lys Gly Lys Asn
1 5 10 15
Arg Tyr Lys Asn Ile Leu Pro Phe Asp His Ser Arg Val Ile Leu Gln
20 25 30
Gly Arg Asp Ser Asn Ile Pro Gly Ser Asp Tyr Ile Asn Ala Asn Tyr
35 40 45
Ile Lys Asn Gln Leu Leu Gly Pro Asp Glu Asn Ala Lys Thr Tyr Ile
50 55 60
Ala Ser Gln Gly Cys Leu Glu Ala Thr Val Asn Asp Phe Trp Gln Met
65 70 75 80
Ala Trp Gln Glu Asn Ser Arg Val Ile Val Met Thr Thr Arg Glu Val
85 90 95
Glu Lys Gly Arg Asn Lys Cys Val Pro Tyr Trp Pro Glu Val Gly Met
100 105 110
Gln Arg Ala Tyr Gly Pro Tyr Ser Val Thr Asn Cys Gly Glu His Asp
115 120 125
Thr Thr Glu Tyr Lys Leu Leu Gln Val Ser Pro Leu Asp Asn Gly Asp
130 135 140
Leu Ile Arg Glu Ile Trp His Tyr Gln Tyr Leu Ser Trp Pro Asp His
145 150 155 160
Gly Val Pro Ser Glu Pro Gly Gly Val Leu Ser Phe Leu Asp Gln Ile
165 170 175
Asn Gln Arg Gln Glu Ser Leu Pro His Ala Gly Pro Ile Ile Val His
180 185 190
Cys Ser Ala Gly Ile Gly Arg Thr Gly Thr Ile Ile Val Ile Asp Met
195 200 205
Leu Met Glu Asn Ile Ser Thr Lys Gly Leu Asp Cys Asp Ile Asp Ile
210 215 220
Gln Lys Thr Ile Gln Met Val Arg Ala Gln Arg Ser Gly Met Val Gln
225 230 235 240
Thr Glu Ala Gln Tyr Lys Phe Ile Tyr Val Ala Ile Ala Gln Phe Ile
245 250 255
Glu Thr Thr Lys Lys Lys Leu Val Ile Asp Met Leu Met Glu Asn Ile
260 265 270
Ser Thr Lys Gly Leu Asp Cys Asp Ile Asp Ile Gln Lys Thr Ile Gln
275 280 285
Met Val Arg Ala Gln Arg Ser Gly Met Val Gln Thr Glu Ala Gln Tyr
290 295 300
Lys Phe Ile Tyr Val Ala Ile Ala Gln Phe Ile Glu Thr Thr Lys Lys
305 310 315 320
Lys Leu

<210> 15
<211> 310
<212> PRT
<213> Homo Sapiens

<400> 15
Asn Gln Ser Cys Asp Ile Ala Leu Leu Pro Glu Asn Arg Gly Lys Asn
1 5 10 15
Arg Tyr Asn Asn Ile Leu Pro Tyr Asp Ala Thr Arg Val Lys Leu Ser
20 25 30
Asn Val Asp Asp Asp Pro Cys Ser Asp Tyr Ile Asn Ala Ser Tyr Ile
35 40 45
Pro Gly Asn Asn Phe Arg Arg Glu Tyr Ile Val Thr Gln Gly Pro Leu
50 55 60
Pro Gly Thr Lys Asp Asp Phe Trp Lys Met Val Trp Glu Gln Asn Val
65 70 75 80
His Asn Ile Val Met Val Thr Gln Cys Val Glu Lys Gly Arg Val Lys
85 90 95
Cys Asp His Tyr Trp Pro Ala Asp Gln Asp Ser Leu Tyr Tyr Gly Asp
100 105 110
Leu Ile Leu Gln Met Leu Ser Glu Ser Val Leu Pro Glu Trp Thr Ile
115 120 125
Phe Lys Ile Cys Gly Glu Glu Gln Leu Asp Ala His Arg Leu Ile Arg
130 135 140
His Phe His Tyr Thr Val Trp Pro Asp His Gly Val Pro Glu Thr Thr
145 150 155 160
Gln Ser Leu Ile Gln Phe Val Arg Thr Val Arg Asp Tyr Ile Asn Arg
165 170 175
Ser Pro Gly Ala Gly Pro Thr Val Val His Cys Ser Ala Gly Val Gly
180 185 190
Arg Thr Gly Thr Phe Ile Ala Leu Asp Arg Ile Leu Gln Gln Leu Asp
195 200 205
Ser Lys Asp Ser Val Asp Ile Tyr Gly Ala Val His Asp Leu Arg Leu
210 215 220
His Arg Val His Met Val Gln Thr Glu Cys Gln Tyr Val Tyr Leu His
225 230 235 240
Gln Cys Val Arg Asp Val Leu Arg Ala Arg Lys Leu Arg Ser Ala Leu
245 250 255
Asp Arg Ile Leu Gln Gln Leu Asp Ser Lys Asp Ser Val Asp Ile Tyr
260 265 270
Gly Ala Val His Asp Leu Arg Leu His Arg Val His Met Val Gln Thr
275 280 285
Glu Cys Gln Tyr Val Tyr Leu His Gln Cys Val Arg Asp Val Leu Arg
290 295 300
Ala Arg Lys Leu Arg Ser
305 310

<210> 16
<211> 309
<212> PRT
<213> Drosophila melanogaster

<400> 16
Asp Gln Pro Cys Thr Phe Ala Asp Leu Pro Cys Asn Arg Pro Lys Asn
1 5 10 15
Arg Phe Thr Asn Ile Leu Pro Tyr Asp His Ser Arg Phe Lys Leu Gln
20 25 30
Pro Val Asp Asp Asp Glu Gly Ser Asp Tyr Ile Asn Ala Asn Tyr Val
35 40 45
Pro Gly His Asn Ser Pro Arg Glu Phe Ile Val Thr Gln Gly Pro Leu
50 55 60
His Ser Thr Arg Asp Asp Phe Trp Arg Met Cys Trp Glu Ser Asn Ser
65 70 75 80
Arg Ala Ile Val Met Leu Thr Arg Cys Phe Glu Lys Gly Arg Glu Lys
85 90 95
Cys Asp Gln Tyr Trp Pro Asn Asp Thr Val Pro Val Phe Tyr Gly Asp
100 105 110
Ile Lys Val Gln Ile Leu Asn Asp Ser His Tyr Ala Asp Trp Val Met
115 120 125
Phe Met Leu Cys Arg Gly Ser Glu Gln Arg Ile Leu Arg His Phe His
130 135 140
Phe Thr Thr Trp Pro Asp Phe Gly Val Pro Asn Pro Pro Gln Thr Leu
145 150 155 160
Val Arg Phe Val Arg Ala Phe Arg Asp Arg Ile Cys Ala Glu Gln Arg
165 170 175
Pro Ile Val Val His Cys Ser Ala Gly Val Gly Arg Ser Gly Thr Phe
180 185 190
Ile Thr Leu Asp Arg Ile Leu Gln Gln Ile Asn Thr Ser Asp Tyr Val
195 200 205
Asp Ile Phe Gly Ile Val Tyr Ala Met Arg Lys Glu Arg Val Trp Met
210 215 220
Val Gln Thr Glu Gln Gln Tyr Ile Cys Ile His Gln Cys Leu Leu Ala
225 230 235 240
Val Leu Glu Gly Lys Glu Asn Ile Val Gly Pro Thr Leu Asp Arg Ile
245 250 255
Leu Gln Gln Ile Asn Thr Ser Asp Tyr Val Asp Ile Phe Gly Ile Val
260 265 270
Tyr Ala Met Arg Glu Lys Arg Val Trp Met Val Gln Thr Glu Gln Gln
275 280 285
Tyr Ile Cys Ile His Gln Cys Leu Leu Ala Val Leu Glu Gly Lys Glu
290 295 300
Asn Ile Val Gly Pro
305

<210> 17
<211> 313
<212> PRT
<213> Homo sapiens

<400> 17
Ser Gln Ser Gln Met Val Ala Ser Ala Ser Glu Asn Asn Ala Lys Asn
1 5 10 15
Arg Tyr Arg Asn Val Leu Pro Tyr Asp Trp Ser Arg Val Pro Leu Lys
20 25 30
Pro Ile His Glu Glu Pro Gly Ser Asp Tyr Ile Asn Ala Ser Phe Met
35 40 45

Pro Gly Leu Trp Ser Pro Gln Glu Phe Ile Ala Thr Gln Gly Pro Leu
50 55 60
Pro Gln Thr Val Gly Asp Phe Trp Arg Leu Val Trp Glu Gln Gln Ser
65 70 75 80
His Thr Leu Val Met Leu Thr Asn Cys Met Glu Ala Gly Arg Val Lys
85 90 95
Cys Glu His Tyr Trp Pro Leu Asp Ser Gln Pro Cys Thr His Gly His
100 105 110
Leu Arg Val Thr Leu Val Gly Glu Glu Val Met Glu Asn Trp Thr Val
115 120 125
Leu Leu Leu Leu Gln Val Glu Glu Gln Lys Thr Leu Ser Val Arg Gln
130 135 140
Phe His Tyr Gln Ala Trp Pro Asp His Gly Val Pro Ser Ser Pro Asp
145 150 155 160
Thr Leu Leu Ala Phe Trp Arg Met Leu Arg Gln Trp Leu Asp Gln Thr
165 170 175
Met Glu Gly Gly Pro Pro Ile Val His Cys Ser Ala Gly Val Gly Arg
180 185 190
Thr Gly Thr Leu Ile Ala Leu Asp Val Leu Leu Arg Glu Leu Gln Ser
195 200 205
Glu Gly Leu Leu Gly Pro Phe Ser Phe Val Arg Lys Met Arg Glu Ser
210 215 220
Arg Pro Leu Met Val Gln Thr Glu Ala Gln Tyr Val Phe Leu His Gln
225 230 235 240
Cys Ile Cys Gly Ser Ser Asn Ser Gln Pro Arg Pro Gln Pro Arg Ala
245 250 255
Leu Asp Val Leu Leu Arg Gln Leu Gln Ser Glu Gly Leu Leu Gly Pro
260 265 270
Phe Ser Phe Val Arg Lys Met Arg Glu Ser Arg Pro Leu Met Val Gln
275 280 285
Thr Glu Ala Gln Tyr Val Phe Leu His Gln Cys Ile Cys Gly Ser Ser
290 295 300
Asn Ser Gln Pro Arg Pro Gln Pro Arg
305 310

<210> 18
<211> 291
<212> PRT
<213> Rattus norvegicus

<400> 18
Phe Val Asp Pro Lys Glu Tyr Asp Ile Pro Gly Leu Val Arg Lys Asn
1 5 10 15
Arg Tyr Lys Thr Ile Leu Pro Asn Pro His Ser Arg Val Arg Leu Thr
20 25 30
Ser Pro Asp Pro Glu Asp Pro Leu Ser Ser Tyr Ile Asn Ala Asn Tyr
35 40 45
Ile Arg Gly Tyr Asn Gly Glu Glu Lys Val Tyr Ile Ala Thr Gln Gly
50 55 60
Pro Ile Val Ser Thr Val Val Asp Phe Trp Arg Met Val Trp Gln Glu
65 70 75 80
Arg Thr Pro Ile Ile Val Met Ile Thr Asn Ile Glu Glu Met Asn Glu
85 90 95
Lys Cys Thr Glu Tyr Trp Pro Glu Glu Gln Val Val His Asp Gly Val

```
                100                 105                 110
Glu Ile Thr Val Gln Lys Val Ile His Thr Glu Asp Tyr Arg Leu Ile
            115                 120                 125
Ser Leu Arg Arg Gly Thr Glu Glu Arg Gly Leu Lys His Tyr Trp Phe
    130                 135                 140
Thr Ser Trp Pro Asp Gln Lys Thr Pro Asp Arg Ala Pro Pro Leu Leu
145                 150                 155                 160
His Leu Val Arg Glu Val Glu Glu Ala Ala Gln Gln Glu Gly Pro His
                165                 170                 175
Cys Ser Pro Ile Ile Val His Cys Ser Ala Gly Ile Gly Arg Thr Gly
            180                 185                 190
Cys Phe Ile Ala Thr Ser Ile Cys Cys Gln Gln Leu Arg Arg Glu Gly
        195                 200                 205
Val Val Asp Ile Leu Lys Thr Thr Cys Gln Leu Arg Gln Asp Arg Gly
    210                 215                 220
Gly Met Ile Gln Thr Cys Glu Gln Tyr Gln Phe Val His His Ala Met
225                 230                 235                 240
Ser Leu Tyr Ala Thr Ser Ile Cys Cys Gln Gln Leu Arg Arg Glu Gly
                245                 250                 255
Val Val Asp Ile Leu Lys Thr Thr Cys Gln Leu Arg Gln Asp Arg Gly
            260                 265                 270
Gly Met Ile Gln Thr Cys Glu Gln Tyr Gln Phe Val His His Ala Met
        275                 280                 285
Ser Leu Tyr
    290
```

<210> 19
<211> 313
<212> PRT
<213> Drosophila melanogaster

<400> 19

```
Asp Arg Thr Thr Lys Asn Ser Asp Leu Lys Glu Asn Ala Cys Lys Asn
 1               5                  10                  15
Arg Tyr Pro Asp Ile Lys Ala Tyr Asp Gln Thr Arg Val Lys Leu Ala
            20                  25                  30
Val Ile Asn Gly Leu Gln Thr Thr Asp Tyr Ile Asn Ala Asn Phe Val
        35                  40                  45
Ile Gly Tyr Lys Glu Arg Lys Lys Phe Ile Cys Ala Gln Gly Pro Met
    50                  55                  60
Glu Ser Thr Ile Asp Asp Phe Trp Arg Met Ile Trp Glu Gln His Leu
65                  70                  75                  80
Glu Ile Ile Val Ile Leu Thr Asn Leu Glu Glu Tyr Asn Lys Ala Lys
                85                  90                  95
Cys Ala Lys Tyr Trp Pro Glu Lys Val Phe Asp Thr Lys Gln Phe Gly
            100                 105                 110
Asp Ile Leu Val Lys Phe Ala Gln Glu Arg Lys Thr Gly Asp Tyr Ile
        115                 120                 125
Glu Leu Asn Val Ser Lys Asn Lys Ala Asn Val Gly Glu Glu Glu Asp
    130                 135                 140
Arg Arg Gln Ile Thr Gln Tyr His Tyr Leu Thr Trp Lys Asp Phe Met
145                 150                 155                 160
Ala Pro Glu His Pro His Gly Ile Ile Lys Phe Ile Arg Gln Ile Asn
                165                 170                 175
```

```
Ser Val Tyr Ser Leu Gln Arg Gly Pro Ile Leu Val His Cys Ser Ala
            180                 185                 190
Gly Val Gly Arg Thr Gly Thr Leu Val Ala Leu Asp Ser Leu Ile Gln
        195                 200                 205
Gln Leu Glu Glu Glu Asp Ser Val Ser Ile Tyr Asn Thr Val Cys Asp
    210                 215                 220
Leu Arg His Gln Arg Asn Phe Leu Val Gln Ser Leu Lys Gln Tyr Ile
225                 230                 235                 240
Phe Leu Tyr Arg Ala Leu Leu Asp Thr Gly Thr Phe Gly Asn Thr Asp
                245                 250                 255
Ile Ala Leu Asp Ser Leu Ile Gln Gln Leu Glu Glu Glu Asp Ser Val
            260                 265                 270
Ser Ile Tyr Asn Thr Val Cys Asp Leu Arg His Gln Arg Asn Phe Leu
        275                 280                 285
Val Gln Ser Leu Lys Gln Tyr Ile Phe Leu Tyr Arg Ala Leu Leu Asp
    290                 295                 300
Thr Gly Thr Phe Gly Asn Thr Asp Ile
305                 310
```

<210> 20
<211> 307
<212> PRT
<213> Homo sapiens

<400> 20

```
Val Gly Thr Phe His Cys Ser Met Ser Pro Gly Asn Leu Glu Lys Asn
 1               5                  10                  15
Arg Tyr Gly Asp Val Pro Cys Leu Asp Gln Thr Arg Val Lys Leu Thr
            20                  25                  30
Lys Arg Ser Gly His Thr Gln Thr Asp Tyr Ile Asn Ala Ser Phe Met
        35                  40                  45
Asp Gly Tyr Lys Gln Lys Asn Ala Tyr Ile Gly Thr Gln Gly Pro Leu
    50                  55                  60
Glu Asn Thr Tyr Arg Asp Phe Trp Leu Met Val Trp Glu Gln Lys Val
65                  70                  75                  80
Leu Val Ile Val Met Thr Thr Arg Phe Glu Glu Gly Gly Arg Arg Lys
                85                  90                  95
Cys Gly Gln Tyr Trp Pro Leu Glu Lys Asp Ser Arg Ile Arg Phe Gly
            100                 105                 110
Phe Leu Thr Val Thr Asn Leu Gly Val Glu Asn Met Asn His Tyr Lys
        115                 120                 125
Lys Leu Glu Ile His Asn Thr Glu Glu Arg Gln Lys Arg Gln Val Thr
    130                 135                 140
His Phe Gln Phe Leu Ser Trp Pro Asp Tyr Gly Val Pro Ser Ser Ala
145                 150                 155                 160
Ala Ser Leu Ile Asp Phe Leu Arg Val Val Arg Asn Gln Gln Ser Leu
                165                 170                 175
Ala Val Ser Asn Met Gly Ala Arg Ser Lys Gly Gln Cys Pro Glu Pro
            180                 185                 190
Pro Ile Val Val His Cys Ser Ala Gly Ile Gly Arg Thr Gly Thr Phe
        195                 200                 205
Cys Ser Leu Asp Ile Cys Leu Ala Gln Leu Glu Glu Leu Gly Thr Leu
    210                 215                 220
Asn Val Phe Gln Thr Val Ser Arg Met Arg Thr Gln Arg Ala Phe Ser
```

225 230 235 240
Ile Gln Thr Pro Glu Gln Tyr Tyr Phe Cys Tyr Lys Ala Ile Leu Glu
245 250 255
Phe Ala Ser Leu Asp Ile Cys Leu Ala Gln Leu Glu Glu Leu Gly Thr
260 265 270
Leu Asn Val Phe Gln Thr Val Ser Arg Met Arg Thr Gln Arg Ala Phe
275 280 285
Ser Ile Gln Thr Pro Glu Gln Tyr Tyr Phe Cys Tyr Lys Ala Ile Leu
290 295 300
Glu Phe Ala
305

<210> 21
<211> 312
<212> PRT
<213> Homo sapiens

<400> 21
Ile Tyr Pro Thr Ala Thr Gly Glu Lys Glu Glu Asn Val Lys Lys Asn
1 5 10 15
Arg Tyr Lys Asp Ile Leu Pro Phe Asp His Ser Arg Val Lys Leu Thr
20 25 30
Leu Lys Thr Pro Ser Gln Asp Ser Asp Tyr Ile Asn Ala Asn Phe Ile
35 40 45
Lys Gly Val Tyr Gly Pro Lys Ala Tyr Val Ala Thr Gln Gly Pro Leu
50 55 60
Ala Asn Thr Val Ile Asp Phe Trp Arg Met Val Trp Glu Tyr Asn Val
65 70 75 80
Val Ile Ile Val Met Ala Cys Arg Glu Phe Glu Met Gly Arg Lys Lys
85 90 95
Cys Glu Arg Tyr Trp Pro Leu Tyr Gly Glu Asp Pro Ile Thr Phe Ala
100 105 110
Pro Phe Lys Ile Ser Cys Glu Asp Glu Gln Ala Arg Thr Asp Tyr Phe
115 120 125
Ile Leu Leu Leu Glu Phe Gln Asn Glu Ser Arg Arg Leu Tyr Gln Phe
130 135 140
His Tyr Val Asn Trp Pro Asp His Asp Val Pro Ser Ser Phe Asp Ser
145 150 155 160
Ile Leu Asp Met Ile Ser Leu Met Arg Lys Tyr Gln Glu His Glu Asp
165 170 175
Val Pro Ile Cys Ile His Cys Ser Ala Gly Cys Gly Arg Thr Gly Ala
180 185 190
Ile Cys Ala Ile Asp Tyr Thr Trp Asn Leu Leu Lys Ala Gly Lys Ile
195 200 205
Pro Glu Glu Phe Asn Val Phe Asn Leu Ile Gln Glu Met Arg Thr Gln
210 215 220
Arg His Ser Ala Val Gln Thr Lys Glu Gln Tyr Glu Leu Val His Arg
225 230 235 240
Ala Ile Ala Gln Leu Phe Glu Lys Gln Leu Gln Leu Tyr Ala Ile Asp
245 250 255
Tyr Thr Trp Asn Leu Leu Lys Ala Gly Lys Ile Pro Glu Glu Phe Asn
260 265 270
Val Phe Asn Leu Ile Gln Glu Met Arg Thr Gln Arg His Ser Ala Val
275 280 285

Gln Thr Lys Glu Gln Tyr Glu Leu Val His Arg Ala Ile Ala Gln Leu
290 295 300
Phe Glu Lys Gln Leu Gln Leu Tyr
305 310

<210> 22
<211> 291
<212> PRT
<213> Homo sapiens

<400> 22
Gly Leu Ala Ile Thr Phe Ala Lys Leu Pro Gln Asn Leu Asp Lys Asn
1 5 10 15
Arg Tyr Lys Asp Val Leu Pro Tyr Asp Thr Thr Arg Val Leu Leu Gln
20 25 30
Gly Asn Glu Asp Tyr Ile Asn Ala Ser Tyr Val Asn Met Glu Ile Pro
35 40 45
Ala Ala Asn Leu Val Asn Lys Tyr Ile Ala Thr Gln Gly Pro Leu Pro
50 55 60
His Thr Cys Ala Gln Phe Trp Gln Val Val Trp Asp Gln Lys Leu Ser
65 70 75 80
Leu Ile Val Met Leu Thr Thr Leu Thr Glu Arg Gly Arg Thr Lys Cys
85 90 95
His Gln Tyr Trp Pro Asp Pro Pro Asp Val Met Asn His Gly Gly Phe
100 105 110
His Ile Gln Cys Gln Ser Glu Asp Cys Thr Ile Ala Tyr Val Ser Met
115 120 125
Leu Val Thr Asn Thr Gln Thr Gly Glu Glu His Thr Val Thr His Leu
130 135 140
Gln Tyr Val Ala Trp Pro Asp His Gly Ile Pro Asp Asp Ser Ser Asp
145 150 155 160
Phe Leu Glu Phe Val Asn Tyr Val Arg Ser Leu Arg Val Asp Ser Glu
165 170 175
Pro Val Leu Val His Cys Ser Ala Gly Ile Gly Arg Thr Gly Val Leu
180 185 190
Val Thr Met Glu Thr Ala Met Cys Leu Thr Glu Arg Asn Leu Pro Ile
195 200 205
Tyr Pro Leu Asp Ile Val Arg Lys Met Arg Asp Gln Arg Ala Met Met
210 215 220
Val Gln Thr Ser Ser Gln Tyr Lys Phe Val Cys Glu Ala Ile Leu Arg
225 230 235 240
Val Tyr Thr Met Glu Thr Ala Met Cys Leu Thr Glu Arg Asn Leu Pro
245 250 255
Ile Tyr Pro Leu Asp Ile Val Arg Lys Met Arg Asp Gln Arg Ala Met
260 265 270
Met Val Gln Thr Ser Ser Gln Tyr Lys Phe Val Cys Glu Ala Ile Leu
275 280 285
Arg Val Tyr
290

<210> 23
<211> 311
<212> PRT
<213> Gallus gallus

<400> 23

Pro Ser Glu Thr Ser Glu Gly Asp Lys Lys His Asn Thr Ser Lys Asn
1 5 10 15

Arg Tyr Thr Asn Ile Leu Pro Val Asn His Thr Arg Val Gln Leu Lys
20 25 30

Lys Ile Gln Asp Lys Glu Gly Ser Asp Tyr Ile Asn Ala Asn Tyr Ile
35 40 45

Asp Gly Ala Tyr Pro Lys Gln Phe Ile Cys Thr Gln Gly Pro Leu Pro
50 55 60

Asn Thr Ile Ala Asp Phe Trp Arg Met Val Trp Glu Asn Arg Cys Arg
65 70 75 80

Ile Ile Val Met Leu Ser Arg Glu Ser Glu Gly Ser Glu Asn Cys Arg
85 90 95

Ile Lys Cys Asp Arg Tyr Trp Pro Glu Gln Ile Gly Gly Glu Gln Phe
100 105 110

Ser Ile Tyr Gly Asn Gly Asn Glu Val Phe Gly Thr Tyr Ser Val Glu
115 120 125

Leu Val Glu Val Ile Gln Cys Arg Gln Ile Ile Thr Arg Asn Ile Arg
130 135 140

Leu Thr Phe Glu Gly Glu Thr Arg Asp Ile Thr Gln Tyr Gln Tyr Glu
145 150 155 160

Gly Trp Pro Asp His Asn Ile Pro Asp His Thr Gln Pro Phe Arg Gln
165 170 175

Leu Leu His Ser Ile Thr Asn Arg Gln Asn Gln Ile Ile Pro Ser Ser
180 185 190

Asp Arg Asn Val Pro Ile Ile Val His Cys Ser Ala Gly Val Gly Arg
195 200 205

Thr Gly Thr Phe Cys Thr Ala Val Ile Met Met Lys Lys Leu Asp His
210 215 220

Tyr Phe Lys Gln Leu Asp Tyr Asn Ser Arg Ile Asp Phe Asn Leu Phe
225 230 235 240

Ser Ile Val Leu Lys Leu Arg Glu Gln Arg Pro Gly Met Val Gln Gln
245 250 255

Leu Glu Gln Tyr Leu Phe Cys Tyr Lys Thr Ile Leu Asp Glu Ile Tyr
260 265 270

His Arg Leu Asn Cys Thr Ala Val Ile Met Met Lys Lys Leu Asp His
275 280 285

Tyr Phe Lys Gln Leu Asp Tyr Asn Ser Arg Ile Asp Phe Asn Leu Phe
290 295 300

Ser Ile Val Leu Lys Leu Arg Glu Gln Arg Pro Gly Met Val Gln Gln
305 310 315 320

Leu Glu Gln Tyr Leu Phe Cys Tyr Lys Thr Ile Leu Asp Glu Ile Tyr
325 330 335

His Arg Leu Asn Cys
340

<210> 24
<211> 312
<212> PRT
<213> Schizosaccharomyces pombe

<400> 24
Gln Trp Ser Thr Val Arg Ser Leu Ser Asn Thr Ser Tyr Lys Lys Asn

```
1               5                  10                  15
Arg Tyr Thr Asp Ile Val Pro Tyr Asn Cys Thr Arg Val His Leu Lys
            20                  25                  30
Arg Thr Ser Pro Ser Glu Leu Asp Tyr Ile Asn Ala Ser Phe Ile Lys
        35                  40                  45
Thr Glu Thr Ser Asn Tyr Ile Ala Cys Gln Gly Ser Ile Ser Arg Ser
    50                  55                  60
Ile Ser Asp Phe Trp His Met Val Trp Asp Asn Val Glu Asn Ile Gly
65                  70                  75                  80
Thr Ile Val Met Leu Gly Ser Leu Phe Glu Ala Gly Arg Glu Met Cys
                85                  90                  95
Thr Ala Tyr Trp Pro Ser Asn Gly Ile Gly Asp Lys Gln Val Tyr Gly
            100                 105                 110
Asp Tyr Cys Val Lys Gln Ile Ser Glu Glu Asn Val Asp Asn Ser Arg
        115                 120                 125
Phe Ile Leu Phe Glu Ile Gln Asn Ala Asn Phe Pro Ser Val Lys Lys
    130                 135                 140
Val His His Tyr Gln Tyr Pro Asn Trp Ser Asp Cys Asn Ser Pro Glu
145                 150                 155                 160
Asn Val Lys Ser Met Val Glu Phe Leu Lys Tyr Val Asn Asn Ser His
                165                 170                 175
Gly Ser Gly Asn Thr Ile Val His Cys Ser Ala Gly Val Gly Arg Thr
            180                 185                 190
Gly Thr Phe Ile Val Leu Asp Thr Ile Leu Arg Phe Pro Glu Ser Lys
        195                 200                 205
Leu Ser Gly Phe Asn Pro Ser Val Ala Asp Ser Ser Asp Val Val Phe
    210                 215                 220
Gln Leu Val Asp His Ile Arg Lys Gln Arg Met Lys Met Val Gln Thr
225                 230                 235                 240
Phe Thr Gln Phe Lys Tyr Val Tyr Asp Leu Ile Asn Ser Leu Val Leu
                245                 250                 255
Asp Thr Ile Leu Arg Phe Pro Glu Ser Lys Leu Ser Gly Phe Asn Pro
            260                 265                 270
Ser Val Ala Asp Ser Ser Asp Val Val Phe Gln Leu Val Asp His Ile
        275                 280                 285
Arg Lys Gln Arg Met Lys Met Val Gln Thr Phe Thr Gln Phe Lys Tyr
    290                 295                 300
Val Tyr Asp Leu Ile Asp Ser Leu
305                 310
```

<210> 25
<211> 307
<212> PRT
<213> Schizosaccaromyces pombe

<400> 25

```
Trp Cys Cys Leu Ala Ser Ser Arg Ser Thr Ser Ile Ser Arg Lys Asn
 1               5                  10                  15
Arg Tyr Thr Asp Ile Val Pro Tyr Asp Lys Thr Arg Val Arg Leu Ala
            20                  25                  30
Val Pro Lys Gly Cys Ser Asp Tyr Ile Asn Ala Ser His Ile Asp Val
        35                  40                  45
Gly Asn Lys Lys Tyr Ile Ala Cys Gln Ala Pro Lys Pro Gly Thr Leu
    50                  55                  60
```

Leu Asp Phe Trp Glu Met Val Trp His Asn Ser Gly Thr Asn Gly Val
65 70 75 80
Ile Val Met Leu Thr Asn Leu Tyr Glu Ala Gly Ser Glu Lys Cys Ser
85 90 95
Gln Tyr Trp Pro Asp Asn Lys Asp His Ala Leu Cys Leu Glu Gly Gly
100 105 110
Leu Arg Ile Ser Val Gln Lys Tyr Glu Thr Phe Glu Asp Leu Lys Val
115 120 125
His Leu Phe Arg Leu Asp Lys Pro Asn Gly Pro Pro Lys Tyr Ile His
130 135 140
His Phe Trp Val His Thr Trp Phe Asp Lys Thr His Pro Asp Ile Glu
145 150 155 160
Ser Ile Thr Gly Leu Ile Arg Cys Ile Asp Lys Val Pro Asn Asp Gly
165 170 175
Pro Met Phe Val His Cys Ser Ala Gly Val Gly Arg Thr Gly Thr Phe
180 185 190
Ile Ala Val Asp Gln Ile Leu Gln Val Pro Lys Asn Ile Leu Pro Lys
195 200 205
Thr Thr Asn Leu Glu Asp Ser Lys Asp Phe Ile Phe Asn Cys Val Asn
210 215 220
Ser Leu Arg Ser Gln Arg Met Lys Met Val Gln Asn Phe Glu Gln Phe
225 230 235 240
Lys Phe Leu Tyr Asp Val Val Asp Tyr Leu Ala Val Asp Gln Ile Leu
245 250 255
Gln Val Pro Lys Asn Ile Leu Pro Lys Thr Thr Asn Leu Glu Asp Ser
260 265 270
Lys Asp Phe Ile Phe Asn Cys Val Asn Ser Leu Arg Ser Gln Arg Met
275 280 285
Lys Met Val Gln Asn Phe Glu Gln Phe Lys Phe Leu Tyr Asp Val Val
290 295 300
Asp Tyr Leu
305

<210> 26
<211> 316
<212> PRT
<213> Homo sapiens

<400> 26
Gly Ile Thr Ala Asp Ser Ser Asn His Pro Asp Asn Lys His Lys Asn
1 5 10 15
Arg Tyr Ile Asn Ile Val Ala Tyr Asp His Ser Arg Val Lys Leu Ala
20 25 30
Gln Leu Ala Glu Lys Asp Gly Lys Leu Thr Asp Tyr Ile Asn Ala Asn
35 40 45
Tyr Val Asp Gly Tyr Asn Arg Pro Lys Ala Tyr Ile Ala Ala Gln Gly
50 55 60
Pro Leu Lys Ser Thr Ala Glu Asp Phe Trp Arg Met Ile Trp Glu His
65 70 75 80
Asn Val Glu Val Ile Val Met Ile Thr Asn Leu Val Glu Lys Gly Arg
85 90 95
Arg Lys Cys Asp Gln Tyr Trp Pro Ala Asp Gly Ser Glu Glu Tyr Gly
100 105 110
Asn Phe Leu Val Thr Gln Lys Ser Val Gln Val Leu Ala Tyr Tyr Thr

```
        115                 120                 125
Val Phe Thr Leu Arg Asn Thr Lys Ile Lys Lys Gly Ser Gln Lys Gly
    130                 135                 140
Arg Pro Ser Gly Arg Val Val Thr Gln Tyr His Tyr Thr Gln Trp Pro
145                 150                 155                 160
Asp Met Gly Val Pro Glu Tyr Ser Leu Pro Val Leu Thr Phe Val Arg
                165                 170                 175
Lys Ala Ala Tyr Ala Lys Arg His Ala Val Gly Pro Val Val Val His
            180                 185                 190
Cys Ser Ala Gly Val Gly Arg Thr Gly Thr Tyr Ile Val Leu Asp Ser
        195                 200                 205
Met Leu Gln Gln Ile Gln His Glu Gly Thr Val Asn Ile Phe Gly Phe
    210                 215                 220
Leu Lys His Ile Arg Ser Gln Arg Asn Tyr Leu Val Gln Thr Glu Glu
225                 230                 235                 240
Gln Tyr Val Phe Ile His Asp Thr Leu Val Glu Ala Ile Leu Ser Lys
                245                 250                 255
Glu Thr Glu Val Val Leu Asp Ser Met Leu Gln Gln Ile Gln His Glu
            260                 265                 270
Gly Thr Val Asn Ile Phe Gly Phe Leu Lys His Ile Arg Ser Gln Arg
        275                 280                 285
Asn Tyr Leu Val Gln Thr Glu Glu Gln Tyr Val Phe Ile His Asp Thr
    290                 295                 300
Leu Val Glu Ala Ile Leu Ser Lys Glu Thr Glu Val
305                 310                 315
```

<210> 27
<211> 294
<212> PRT
<213> Homo sapiens

<400> 27

```
Thr Ser Arg Phe Ile Ser Ala Asn Leu Pro Cys Asn Lys Phe Lys Asn
 1               5                  10                  15
Arg Leu Val Asn Ile Met Pro Tyr Glu Leu Thr Arg Val Cys Leu Gln
            20                  25                  30
Pro Ile Arg Gly Val Glu Gly Ser Asp Tyr Ile Asn Ala Ser Phe Leu
        35                  40                  45
Asp Gly Tyr Arg Gln Gln Lys Ala Tyr Ile Ala Thr Gln Gly Pro Leu
    50                  55                  60
Ala Glu Ser Thr Glu Asp Phe Trp Arg Met Leu Trp Glu His Asn Ser
65                  70                  75                  80
Thr Ile Ile Val Met Leu Thr Lys Leu Arg Glu Met Gly Arg Glu Lys
                85                  90                  95
Cys His Gln Tyr Trp Pro Ala Glu Arg Ser Ala Arg Tyr Gln Tyr Phe
            100                 105                 110
Val Val Asp Pro Met Ala Glu Tyr Asn Met Pro Gln Tyr Ile Leu Phe
        115                 120                 125
Lys Val Thr Asp Ala Arg Asp Gly Gln Ser Arg Thr Ile Arg Gln Phe
    130                 135                 140
Gln Phe Thr Asp Trp Pro Glu Gln Gly Val Pro Lys Thr Gly Glu Gly
145                 150                 155                 160
Phe Ile Asp Phe Ile Gly Gln Val His Lys Thr Lys Glu Gln Phe Gly
                165                 170                 175
```

```
Gln Asp Gly Pro Ile Thr Val His Cys Ser Ala Gly Val Gly Arg Thr
            180                 185                 190
Gly Val Phe Ile Thr Leu Ser Ile Val Leu Glu Arg Met Arg Tyr Glu
        195                 200                 205
Gly Val Val Asp Met Phe Gln Thr Val Lys Thr Leu Arg Thr Gln Arg
    210                 215                 220
Pro Ala Met Val Gln Thr Glu Asp Gln Tyr Gln Leu Cys Tyr Arg Ala
225                 230                 235                 240
Ala Leu Glu Tyr Leu Thr Leu Ser Ile Val Leu Glu Arg Met Arg Tyr
                245                 250                 255
Glu Gly Val Val Asp Met Phe Gln Thr Val Lys Thr Leu Arg Thr Gln
            260                 265                 270
Arg Pro Ala Met Val Gln Thr Glu Asp Gln Tyr Gln Leu Cys Tyr Arg
        275                 280                 285
Ala Ala Leu Glu Tyr Leu
    290
```

<210> 28
<211> 281
<212> PRT
<213> Homo sapiens

<400> 28

```
Asn Asp Lys Met Arg Thr Gly Asn Leu Pro Ala Asn Met Lys Lys Asn
 1               5                  10                  15
Arg Val Leu Gln Ile Ile Pro Tyr Glu Phe Asn Arg Val Ile Ile Pro
            20                  25                  30
Val Lys Arg Gly Glu Asn Asp Lys Met Arg Thr Gly Asn Leu Pro Ala
        35                  40                  45
Asn Met Lys Lys Asn Arg Val Leu Gln Ile Ile Pro Tyr Glu Phe Asn
    50                  55                  60
Arg Val Ile Ile Pro Val Lys Arg Gly Glu Glu Asn Thr Asp Tyr Val
65                  70                  75                  80
Asn Ala Ser Phe Ile Asp Gly Tyr Arg Gln Lys Asp Ser Tyr Ile Ala
                85                  90                  95
Ser Gln Gly Pro Leu Leu His Thr Ile Glu Asp Phe Trp Arg Met Ile
            100                 105                 110
Trp Glu Trp Lys Ser Cys Ser Ile Val Met Leu Thr Glu Leu Glu Glu
        115                 120                 125
Arg Gly Gln Glu Lys Cys Ala Gln Tyr Trp Pro Ser Asp Gly Leu Val
    130                 135                 140
Ser Tyr Gly Asp Ile Thr Val Glu Leu Lys Lys Glu Glu Glu Cys Glu
145                 150                 155                 160
Ser Tyr Thr Val Leu Leu Val Thr Asn Thr Arg Glu Asn Lys Ser Arg
                165                 170                 175
Gln Ile Arg Gln Phe His Phe His Gly Trp Pro Glu Val Gly Ile Pro
            180                 185                 190
Ser Asp Gly Lys Gly Met Ile Ser Ile Ile Ala Ala Val Gln Lys Gln
        195                 200                 205
Gln Gln Gln Ser Gly Asn His Pro Ile Thr Val His Cys Ser Ala Gly
    210                 215                 220
Ala Gly Arg Thr Gly Thr Phe Cys Ala Leu Ser Thr Val Leu Glu Arg
225                 230                 235                 240
Val Lys Ala Glu Gly Ile Leu Asp Val Phe Gln Thr Val Lys Ser Leu
```

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                245                 250                 255
Arg Leu Gln Arg Pro His Met Val Gln Thr Leu Glu Gln Tyr Glu Phe
            260                 265                 270
Cys Tyr Lys Val Val Gln Glu Tyr Ile
        275                 280
```

<210> 29
<211> 298
<212> PRT
<213> Homo sapiens

<400> 29

```
Lys Glu Asn Met Arg Thr Gly Asn Leu Pro Ala Asn Met Lys Lys Ala
 1               5                  10                  15
Arg Val Ile Gln Ile Ile Pro Tyr Asp Phe Asn Arg Val Ile Leu Ser
            20                  25                  30
Met Lys Arg Gly Gln Glu Tyr Thr Asp Tyr Ile Asn Ala Ser Phe Ile
        35                  40                  45
Asp Gly Tyr Arg Gln Lys Asp Tyr Phe Ile Ala Thr Gln Gly Pro Leu
    50                  55                  60
Ala His Thr Val Glu Asp Phe Trp Arg Met Ile Trp Glu Trp Lys Ser
65                  70                  75                  80
His Thr Ile Val Met Leu Thr Glu Val Gln Glu Arg Glu Gln Asp Lys
                85                  90                  95
Cys Tyr Gln Tyr Trp Pro Thr Glu Gly Ser Val Thr His Gly Glu Ile
            100                 105                 110
Thr Ile Glu Ile Lys Asn Asp Thr Leu Ser Glu Ala Ile Ser Ile Phe
        115                 120                 125
Leu Val Thr Leu Asn Gln Pro Gln Ala Arg Gln Glu Glu Gln Val Arg
    130                 135                 140
Val Val Arg Gln Phe His Phe His Gly Trp Pro Glu Ile Gly Ile Pro
145                 150                 155                 160
Ala Glu Gly Lys Gly Met Ile Asp Leu Ile Ala Ala Val Gln Lys Gln
                165                 170                 175
Gln Gln Gln Thr Gly Asn His Pro Ile Thr Val His Cys Ser Ala Gly
            180                 185                 190
Ala Gly Arg Thr Gly Thr Phe Ile Ala Leu Ser Asn Ile Leu Glu Arg
        195                 200                 205
Val Lys Ala Glu Gly Leu Leu Asp Val Phe Gln Ala Val Lys Ser Leu
    210                 215                 220
Arg Leu Gln Arg Pro His Met Val Gln Thr Leu Glu Gln Tyr Glu Phe
225                 230                 235                 240
Cys Tyr Lys Val Val Gln Asp Phe Ile Ala Leu Ser Asn Ile Leu Glu
                245                 250                 255
Arg Val Lys Ala Glu Gly Leu Leu Asp Val Phe Gln Ala Val Lys Ser
            260                 265                 270
Leu Arg Leu Gln Arg Pro His Met Val Gln Thr Leu Glu Gln Tyr Glu
        275                 280                 285
Phe Cys Tyr Lys Val Val Gln Asp Phe Ile
    290                 295
```

<210> 30
<211> 301
<212> PRT

<213> Homo sapiens

<400> 30
Val Glu Asp Cys Ser Ile Ala Leu Leu Pro Arg Asn His Glu Lys Asn
1 5 10 15
Arg Cys Met Asp Ile Leu Pro Pro Asp Arg Cys Leu Pro Phe Leu Ile
20 25 30
Thr Ile Asp Gly Glu Ser Ser Asn Tyr Ile Asn Ala Ala Leu Met Asp
35 40 45
Ser Tyr Lys Gln Pro Ser Ala Phe Ile Val Thr Gln His Pro Leu Pro
50 55 60
Asn Thr Val Lys Asp Phe Trp Arg Leu Val Leu Asp Tyr His Cys Thr
65 70 75 80
Ser Val Val Met Leu Asn Asp Val Asp Pro Ala Gln Leu Cys Pro Gln
85 90 95
Tyr Trp Pro Glu Asn Gly Val His Arg His Gly Pro Ile Gln Val Glu
100 105 110
Phe Val Ser Ala Asp Leu Glu Glu Asp Ile Ile Ser Phe Arg Ile Tyr
115 120 125
Asn Ala Ala Arg Pro Gln Asp Gly Tyr Arg Met Val Gln Gln Phe Gln
130 135 140
Phe Leu Gly Trp Pro Met Tyr Arg Asp Thr Pro Val Ser Lys Arg Ser
145 150 155 160
Phe Leu Lys Leu Ile Arg Gln Val Asp Lys Trp Gln Glu Glu Tyr Asn
165 170 175
Gly Gly Glu Gly Pro Thr Val Val His Cys Leu Asn Gly Gly Gly Arg
180 185 190
Ser Gly Thr Phe Cys Ala Ile Ser Ile Val Cys Glu Met Leu Arg His
195 200 205
Gln Arg Thr Val Asp Val Phe His Ala Val Lys Thr Leu Arg Asn Asn
210 215 220
Lys Pro Asn Met Val Asp Leu Leu Asp Gln Tyr Lys Phe Cys Tyr Glu
225 230 235 240
Val Ala Leu Glu Tyr Leu Asn Ser Gly Ala Ile Ser Ile Val Cys Glu
245 250 255
Met Leu Arg His Gly Arg Thr Val Asp Val Phe His Ala Val Lys Thr
260 265 270
Leu Arg Asn Asn Lys Pro Asn Met Val Asp Leu Leu Asp Gln Tyr Lys
275 280 285
Phe Cys Tyr Glu Val Ala Leu Glu Tyr Leu Asn Ser Gly
290 295 300

<210> 31
<211> 333
<212> PRT
<213> Mus musculus

<400> 31
Trp Arg Thr Gln His Ile Gly Asn Gln Glu Glu Asn Lys Lys Lys Asn
1 5 10 15
Arg Asn Ser Asn Val Val Pro Tyr Asp Phe Asn Arg Val Pro Leu Lys
20 25 30
His Glu Leu Glu Met Ser Lys Glu Ser Glu Pro Glu Ser Asp Glu Ser
35 40 45

Ser Asp Asp Asp Ser Asp Ser Glu Glu Thr Ser Lys Tyr Ile Asn Ala
50 55 60
Ser Phe Val Met Ser Tyr Trp Lys Pro Glu Met Met Ile Ala Ala Gln
65 70 75 80
Gly Pro Leu Lys Glu Thr Ile Gly Asp Phe Trp Gln Met Ile Phe Gln
85 90 95
Arg Lys Val Lys Val Ile Val Met Leu Thr Glu Leu Val Asn Gly Asp
100 105 110
Gln Glu Val Cys Ala Gln Tyr Trp Gly Glu Gly Lys Gln Thr Tyr Gly
115 120 125
Asp Met Glu Val Glu Met Lys Asp Thr Asn Arg Ala Ser Ala Tyr Thr
130 135 140
Leu Phe Glu Leu Arg His Ser Lys Arg Lys Glu Pro Arg Thr Val Tyr
145 150 155 160
Gln Tyr Gln Cys Thr Thr Trp Lys Gly Glu Glu Leu Pro Ala Glu Pro
165 170 175
Lys Asp Leu Val Ser Met Ile Gln Asp Leu Lys Gln Lys Leu Pro Lys
180 185 190
Ala Ser Pro Glu Gly Met Lys Tyr His Lys His Ala Ser Ile Leu Val
195 200 205
His Cys Arg Asp Gly Ser Gln Gln Thr Gly Leu Phe Cys Ala Leu Phe
210 215 220
Asn Leu Leu Glu Ser Ala Glu Thr Glu Asp Val Val Asp Val Phe Gln
225 230 235 240
Val Val Lys Ser Leu Arg Lys Ala Arg Pro Gly Val Val Cys Ser Tyr
245 250 255
Glu Gln Tyr Gln Phe Leu Tyr Asp Ile Ile Ala Ser Ile Tyr Pro Ala
260 265 270
Gln Asn Gly Thr Val Ala Leu Phe Asn Leu Leu Glu Ser Ala Glu Thr
275 280 285
Glu Asp Val Val Asp Val Phe Gln Val Val Lys Ser Leu Arg Lys Ala
290 295 300
Arg Pro Gly Val Val Cys Ser Tyr Glu Gln Tyr Gln Phe Leu Tyr Asp
305 310 315 320
Ile Ile Ala Ser Ile Tyr Pro Ala Gln Asn Gly Gln Val
325 330

<210> 32
<211> 295
<212> PRT
<213> Drosophila melanogaster

<400> 32
Ser Lys Ser Cys Ser Val Gly Glu Asn Glu Glu Asn Asn Met Lys Asn
1 5 10 15
Arg Ser Gln Glu Ile Ile Pro Tyr Asp Arg Asn Arg Val Ile Leu Thr
20 25 30
Pro Leu Pro Met Arg Glu Asn Ser Thr Tyr Ile Asn Ala Ser Phe Ile
35 40 45
Glu Gly Tyr Asp Asn Ser Glu Thr Phe Ile Ile Ala Gln Asp Pro Phe
50 55 60
Glu Asn Thr Ile Gly Asp Phe Trp Arg Met Ile Ser Glu Gln Ser Val
65 70 75 80
Thr Thr Leu Val Met Ile Ser Glu Ile Gly Asp Gly Pro Arg Lys Cys

Pro Arg Tyr Trp Ala Asp Asp Glu Val Gln Tyr Asp His Ile Leu Val
100 105 110
Lys Tyr Val His Ser Glu Ser Cys Pro Tyr Tyr Thr Phe Phe Tyr Val
115 120 125
Thr Asn Cys Lys Ile Asp Asp Thr Leu Lys Val Thr Gln Phe Gln Tyr
130 135 140
Asn Gly Trp Pro Thr Val Asp Gly Glu Val Pro Glu Val Cys Arg Gly
145 150 155 160
Ile Ile Glu Leu Val Asp Gln Ala Tyr Asn His Tyr Lys Asn Asn Lys
165 170 175
Asn Ser Gly Cys Arg Ser Pro Leu Thr Val His Cys Ser Leu Gly Thr
180 185 190
Asp Arg Ser Ser Ile Phe Val Ala Met Cys Ile Leu Val Gln His Leu
195 200 205
Arg Leu Glu Lys Cys Val Asp Ile Cys Ala Thr Thr Arg Lys Leu Arg
210 215 220
Ser Gln Arg Thr Gly Leu Ile Asn Ser Tyr Ala Gln Tyr Glu Phe Leu
225 230 235 240
His Arg Ala Ile Ile Asn Tyr Ala Met Cys Ile Leu Val Gln His Leu
245 250 255
Arg Leu Glu Lys Cys Val Asp Ile Cys Ala Thr Thr Arg Lys Leu Arg
260 265 270
Ser Gln Arg Thr Gly Leu Ile Asn Ser Tyr Ala Gln Tyr Glu Phe Leu
275 280 285
His Arg Ala Ile Ile Asn Tyr
290 295

<210> 33
<211> 300
<212> PRT
<213> Homo sapiens

<400> 33
Gln Ser Asp Tyr Ser Ala Ala Leu Lys Gln Cys Asn Arg Glu Lys Asn
1 5 10 15
Arg Thr Ser Ser Ile Ile Pro Val Glu Arg Ser Arg Val Gly Ile Ser
20 25 30
Ser Leu Ser Gly Glu Gly Thr Asp Tyr Ile Asn Ala Ser Tyr Ile Met
35 40 45
Gly Tyr Tyr Gln Ser Asn Glu Phe Ile Ile Thr Gln His Pro Leu Leu
50 55 60
His Thr Ile Lys Asp Phe Trp Arg Met Ile Trp Asp His Asn Ala Gln
65 70 75 80
Leu Val Val Met Ile Pro Asp Gly Glu Asn Met Ala Glu Asp Glu Phe
85 90 95
Val Tyr Trp Pro Asn Lys Asp Glu Pro Ile Asn Cys Glu Ser Phe Lys
100 105 110
Val Thr Leu Met Ala Glu Glu His Lys Cys Leu Ser Asn Glu Glu Lys
115 120 125
Leu Ile Ile Phe Ile Leu Glu Ala Thr Gln Asp Asp Tyr Val Leu Glu
130 135 140
Val Arg His Phe Gln Cys Ile Lys Trp Pro Asn Pro Asp Ser Pro Ile
145 150 155 160

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Ser Lys Thr Phe Glu Leu Ile Ser Val Ile Lys Glu Glu Ala Ala Arg
                165                 170                 175
Arg Asp Gly Pro Met Ile Val His Asp Glu His Gly Gly Val Thr Ala
            180                 185                 190
Gly Thr Phe Cys Ala Leu Thr Thr Leu Met His Gln Leu Glu Lys Glu
        195                 200                 205
Asn Ser Val Asp Val Tyr Gln Val Ala Lys Met Ile Asn Leu Met Arg
    210                 215                 220
Pro Gly Val Phe Ala Asp Ile Glu Gln Tyr Gln Phe Leu Tyr Lys Val
225                 230                 235                 240
Ile Leu Ser Leu Val Ser Thr Arg Gln Glu Glu Asn Ala Leu Thr Thr
                245                 250                 255
Leu Met His Gln Leu Glu Lys Glu Asn Ser Val Asp Val Tyr Gln Val
            260                 265                 270
Ala Lys Met Ile Asn Leu Met Arg Pro Gly Val Phe Ala Asp Ile Glu
        275                 280                 285
Gln Tyr Gln Phe Leu Tyr Lys Val Ile Leu Ser Leu Val Ser Thr Arg
    290                 295                 300
Gln Glu Glu Asn
305

<210> 34
<211> 308
<212> PRT
<213> Homo sapiens

<400> 34
Val Glu Cys Phe Ser Ala Gln Lys Glu Cys Asn Lys Glu Lys Asn Arg
 1               5                  10                  15
Asn Ser Ser Val Val Pro Ser Glu Arg Ala Asn Val Gly Leu Ala Pro
            20                  25                  30
Leu Pro Gly Met Lys Gly Thr Asp Tyr Ile Asn Ala Ser Tyr Ile Met
        35                  40                  45
Gly Tyr Tyr Arg Ser Asn Glu Phe Ile Ile Thr Gln His Pro Leu Pro
    50                  55                  60
His Thr Thr Lys Asp Phe Trp Arg Met Ile Trp Asp His Asn Ala Gln
65                  70                  75                  80
Ile Ile Val Met Leu Pro Asp Asn Gln Ser Leu Ala Glu Asp Glu Phe
                85                  90                  95
Val Tyr Trp Pro Ser Arg Glu Glu Ser Met Asn Cys Glu Ala Phe Thr
            100                 105                 110
Val Thr Leu Ile Ser Lys Asp Arg Leu Cys Leu Ser Asn Glu Glu Gln
        115                 120                 125
Ile Ile Ile Phe Ile Leu Glu Ala Thr Gln Asp Asp Tyr Val Leu Glu
    130                 135                 140
Val Arg His Phe Gln Cys Pro Lys Trp Pro Asn Pro Asp Ala Pro Ile
145                 150                 155                 160
Ser Ser Thr Phe Glu Leu Ile Asn Val Ile Lys Glu Glu Ala Leu Thr
                165                 170                 175
Arg Asp Gly Pro Thr Ile Val His Asp Glu Tyr Gly Ala Val Ser Ala
            180                 185                 190
Gly Met Leu Cys Ala Leu Thr Thr Leu Ser Gln Gln Leu Glu Asn Glu
        195                 200                 205
Asn Ala Val Asp Val Phe Gln Val Ala Lys Met Ile Asn Leu Met Arg
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    210                 215                 220
Pro Gly Val Phe Thr Asp Ile Glu Gln Tyr Gln Phe Ile Tyr Lys Ala
225                 230                 235                 240
Met Leu Ser Leu Val Ser Thr Lys Glu Asn Gly Asn Ala Leu Thr Thr
                245                 250                 255
Leu Ser Gln Gln Leu Glu Asn Glu Asn Ala Val Asp Val Phe Gln Val
            260                 265                 270
Ala Lys Met Ile Asn Leu Met Arg Pro Gly Val Phe Thr Asp Ile Glu
        275                 280                 285
Gln Tyr Gln Phe Ile Tyr Lys Ala Met Leu Ser Leu Val Ser Thr Lys
    290                 295                 300
Glu Asn Gly Asn
305
```

<210> 35
<211> 335
<212> PRT
<213> Drosophila melanogaster

```
<400> 35
Glu Thr Asn Leu Met Ala Glu Gln Val Glu Glu Leu Lys Asn Cys Thr
 1               5                  10                  15
Pro Tyr Leu Glu Gln Gln Tyr Lys Asn Ile Ile Gln Phe Gln Pro Lys
            20                  25                  30
Asp Ile His Ile Ala Ser Ala Met Lys Gln Val Asn Ser Ile Lys Asn
        35                  40                  45
Arg Gly Ala Ile Phe Pro Ile Glu Gly Ser Arg Val His Leu Thr Pro
    50                  55                  60
Lys Pro Gly Glu Asp Gly Ser Asp Tyr Ile Asn Ala Ser Trp Leu His
65                  70                  75                  80
Gly Phe Arg Arg Leu Arg Asp Phe Ile Val Thr Gln His Pro Met Ala
                85                  90                  95
His Thr Ile Lys Asp Phe Trp Gln Met Val Trp Asp His Asn Ala Gln
            100                 105                 110
Thr Val Val Leu Leu Ser Ser Leu Asp Asp Ile Asn Phe Ala Gln Phe
        115                 120                 125
Trp Pro Asp Glu Ala Thr Pro Ile Glu Ser Asp His Tyr Arg Val Lys
    130                 135                 140
Phe Leu Asn Lys Thr Asn Lys Ser Asp Tyr Val Ser Phe Val Ile Gln
145                 150                 155                 160
Ser Ile Gln Asp Asp Tyr Glu Leu Thr Val Lys Met Leu His Cys Pro
                165                 170                 175
Ser Trp Pro Glu Met Ser Asn Pro Asn Ser Ile Tyr Asp Phe Ile Val
            180                 185                 190
Asp Val His Glu Arg Cys Asn Asp Tyr Arg Asn Gly Pro Ile Val Ile
        195                 200                 205
Val Asp Arg Tyr Gly Gly Ala Gln Ala Cys Thr Phe Cys Ala Ile Ser
    210                 215                 220
Ser Leu Ala Ile Glu Met Glu Tyr Cys Ser Thr Ala Asn Val Tyr Gln
225                 230                 235                 240
Tyr Ala Lys Leu Tyr His Asn Lys Arg Pro Gly Val Trp Thr Ser Ser
                245                 250                 255
Glu Asp Ile Arg Val Ile Tyr Asn Ile Leu Ser Phe Leu Pro Gly Asn
            260                 265                 270
```

Leu Asn Leu Leu Lys Arg Ala Ile Ser Ser Leu Ala Ile Gln Met Gln
275 280 285
Tyr Cys Ser Thr Ala Asn Val Tyr Gln Tyr Ala Lys Leu Tyr His Asn
290 295 300
Lys Arg Pro Gly Val Trp Thr Ser Ser Glu Asp Ile Arg Val Ile Tyr
305 310 315 320
Asn Ile Leu Ser Phe Leu Pro Gly Asn Leu Asn Leu Leu Lys Arg
325 330 335

<210> 36
<211> 237
<212> PRT
<213> Yersinia sp.

<400> 36
Thr Asn Asp Pro Arg Tyr Leu Gln Ala Cys Gly Gly Glu Lys Ile Leu
1 5 10 15
Asn Arg Phe Arg Asp Ile Gln Cys Cys Arg Gln Thr Ala Val Arg Ala
20 25 30
Asp Asn Tyr Ile Gln Val Gly Asn Thr Arg Thr Ile Ala Cys Gln Tyr
35 40 45
Pro Leu Gln Ser Gln Leu Glu Ser His Phe Arg Met Leu Ala Glu Asn
50 55 60
Arg Thr Pro Val Leu Ala Val Leu Ala Ser Ser Ser Glu Ile Ala Asn
65 70 75 80
Gln Arg Phe Gly Met Pro Asp Tyr Phe Arg Gln Ser Gly Thr Tyr Gly
85 90 95
Ser Ile Thr Val Glu Ser Lys Met Thr Gln Gln Val Gly Leu Gly Asp
100 105 110
Gly Ile Asn Met Tyr Thr Leu Thr Ile Arg Glu Ala Gly Gln Lys Thr
115 120 125
Ile Ser Val Pro Val Val His Val Gly Asn Trp Pro Asp Gln Thr Ala
130 135 140
Val Ser Ser Glu Val Thr Lys Ala Leu Ala Ser Leu Val Asp Gln Thr
145 150 155 160
Ala Glu Thr Lys Arg Asn Met Tyr Glu Ser Lys Gly Ser Ser Ala Val
165 170 175
Ala Asp Asp Ser Lys Leu Arg Pro Val Ile His Cys Arg Ala Gly Val
180 185 190
Gly Arg Thr Ala Gln Leu Ile Gly Ala Met Cys Met Asn Asp Ser Arg
195 200 205
Asn Ser Gln Leu Ser Val Glu Asp Met Val Ser Gln Met Arg Val Gln
210 215 220
Arg Asn Gly Met Val Gln Lys Asp Glu Gln Leu Asp Val Leu Ile Lys
225 230 235 240
Leu Ala Glu Gly Ala Met Cys Met Asn Asp Ser Arg Asn Ser Gln Leu
245 250 255
Ser Val Glu Asp Met Val Ser Gln Met Arg Val Gln Arg Asn Gly Met
260 265 270
Val Gln Lys Asp Glu Gln Leu Asp Val Leu Ile Lys Leu Ala Glu
275 280 285

<210> 37
<211> 7

<212> PRT
<213> Artificial Sequence

<220>
<223> Fluorescently-labeled phosphopeptides derived from amino acids 1170-1176 of the EGF receptor sequence.

<221> PHOSPHORYLATION
<222> (4)...(4)

<400> 37
Asn Ala Glu Tyr Leu Arg Val
1 5

<210> 38
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Preferred substrate for PTB1B, corresponding to residues 988-993 of human EGF receptor.

<221> PHOSPHORYLATION
<222> (5)...(5)

<400> 38
Asp Ala Asp Glu Tyr Leu
1 5

<210> 39
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Substrate for PTBs synthesized from residues 1142-1152 of human insulin receptor.

<221> PHOSPHORYLATION
<222> (5)...(5)

<400> 39
Thr Arg Asp Ile Tyr Glu Thr Asp Tyr Tyr Arg
1 5 10

<210> 40
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Substrate for PTBs synthesized from residues

tyrosine of p56lck, the src-like lymphocyte specific protein tyrosine kinase that is a physiological substrate for CD45.

(221) PHOSPHORYLATION
(222) (6)...(6)

(400) 40
Ala Thr Gln Gly Gln Tyr Gln Pro Gln Pro
1 5 10